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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of: Martin Buchsel et al

Application No.: 10/073,096

Group Art Unit: To be assigned

Filed: February 12, 2002

Examiner: To be assigned

For: METHOD OF PRODUCING A
SELF-CLEANING AND NON-ADHESIVE
PAPER OR PAPER-LIKE MATERIAL

Attorney Docket No.: 10869-009

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination of the above-identified new application, the Examiner is kindly requested to consider the following amendments and comments.

In the claims:

Please amend the claims to read as follows. Marked up versions of the amended claims, showing additions and deletions, are shown in Appendix A.

1.(amended) A micro-structured paper or paper-like material having a self-cleaning and/or non-adhesive effect wherein the paper or paper-like material is micro-structured in such a way that the surface is provided with elevations and depressions whereby the distance between the elevations ranges from 0.04 to 100 microns and the height of the elevations ranges from 0.04 to 100 microns, wherein the paper or paper-like material contains particles having a size of 0.04 to 50 microns, wherein said particles are bound to said paper or paper-like material by means of a binder, and wherein the paper or paper-like material is hydrophobic across the entire cross-section of the material.

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2.(amended) The paper or paper-like material of claim 1, wherein said paper or paper-like material is additionally oil repellant.

3.(amended) The paper or paper-like material of claim 1, wherein said paper or paper-like material has a contact angle with water greater than 120°.

4.(amended) A method to manufacture micro-structured paper or paper-like material that is water-repellant across the entire cross section of the material and having a self-cleaning and/or non-adhesive effect comprising:

providing a paper or paper-like material comprising fibers with elevations and depressions whereby the distance between the elevations ranges from 0.04 to 100 microns and the height of the elevations ranges from 0.04 to 100 microns;

providing particles of a size of 0.04 to 50 microns;

and fixing said particles to the fibers by means of a wet-laying method using a binder together with a water-repelling agent.

5.(amended) The method to manufacture micro-structured paper or paper-like material of claim 4, wherein said fibers are cellulosic fibers.

6.(amended) The method of claim 4, wherein said fibers comprise synthetic fibers made of polypropylene, polyvinyl acetate, polythethylene or polylactic acid.

7.(amended) The method of claim 4 wherein said particles are added in the amount of about 5 to about 65% per basis weight of said paper or paper-like material.

8.(amended) The method of claim 4 further comprising adding an oil-repelling agent to the paper or paper-like material.

9.(amended) The method of claim 8, wherein said water-repelling agents, oil-repelling agents, or both are added by the colloidal solution/gel method.

10.(amended) The method of claim 4, wherein optionally a first oil-repelling agent is added to the paper or paper-like material, and further comprising adding a second supplementary water-repelling finish, a oil-repelling finish, or both.

11.(amended) The method according to claim 4, wherein said particles are selected from metal oxides, corundum, silicon dioxide, quartz, quartz powder, silica brine; TiO₂, carbonates, sulfates, china, clay or talcum.

12.(amended) The method according to claim 4, wherein the binder is selected from latex binders, acrylate binders, styrene binders, or mixtures thereof, or fluorinated silanes, fluorinated or non-fluorinated siloxanes, functionalized or non-functionalized silicone oils, or mixtures thereof.

13.(amended) The method claim 4, further comprising an additional step of printing one micro-structured side of said paper or paper-like material.

14.(amended) The method according to claim 13, wherein said printing occurs before making said paper or paper-like material water-repellant.

15.(amended) A paper or paper-like product comprising said paper or paper-like material according to claim 1, wherein said product is adapted to be release paper, packing paper, cardboard boxes, or posters, such that at least a portion of the paper or paper-like material is on the exterior of the release paper, packing paper, cardboard boxes, or posters.

Please add new claims 16 - 22.

16. (New) The method of claim 5, wherein said fibers additionally comprise synthetic fibers made of polypropylene, polyvinyl acetate, polythethylene, polylactic acid, or mixture thereof.

17. (New) The method of claim 8, further comprising the step of printing on the paper or paper-like material before adding said oil-repelling agent.

18. (New) A micro-structured paper or paper-like product having a self-cleaning and/or non-adhesive effect comprising:

a paper or paper-like material having a first surface and a second surface, wherein at least the first surface comprises alternating elevations and depressions, whereby the distance between the elevations ranges from 0.04 to 100 microns and the height of the elevations as determined from the depressions ranges from 0.04 to 100 microns;

particles having a size of 0.04 to 50 microns in an amount between about 5% and about 65% by weight of the paper or paper-like material, wherein the particles comprise an hydrophillic inorganic material bound to at least the first surface of the paper or paper-like material by means of a binder in an amount of about 1% to about 20% by weight of the paper and a first water-repelling agent in the amounts of 0.5 to 10% by weight of the paper or paper-like material applied by a wet-laying method;

wherein said paper or paper-like material is hydrophobic across the entire cross-section of the material and exhibiting a contact angle greater than 155° and substantially no hysteresis between advance contact angle and receding contact angle.

19. (New) The paper or paper-like material of claim 18, wherein the distance between the elevations ranges from about 0.4 to about 20 microns, the height of the elevations ranges from about 0.4 to about 20 microns, the particles have a mean size between about 0.08 microns and about 30 microns, and wherein the paper or paper-like material further comprises a second water-repelling agent in an amount between about 0.5% to about 10% by weight of the paper or paper-like material.

20. (New) The paper or paper-like material of claim 18, wherein the paper or paper-like material comprises cellulosic fibers, wherein both the first and the second sides comprise alternating elevations and depressions and the distance between the elevations ranges from about 0.4 to about 20 microns and the height of the elevations ranges from about

0.4 to about 20 microns, and wherein the particles are bound to both the first and the second sides of the paper or paper-like material.

21. (New) The paper or paper-like material of claim 20, wherein the paper or paper-like product further comprises hydrophobic organic particles having a mean size between about 0.08 microns and about 30 microns bound to at least the second surface by said binder.

22. (New) The paper or paper-like material of claim 20, wherein the paper or paper-like product further comprises fibers of polypropylene, polyvinyl acetate, polythethylene, polylactic acid, polyvinyl acetate, or bi-component fibers made of polypropylene and polyethylene.

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REMARKS

Claims 1 - 15 and new claims 16 to 22 are pending in this application.

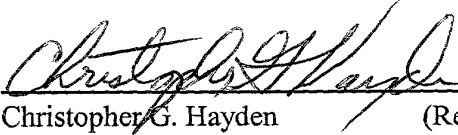
Early consideration and allowance are respectfully requested.

A fee of \$36.00 is believed due for the additional claims, and a separate Amendment Fee Transmittal Sheet for this amount is attached hereto. An Extension of Time for two (2) months is also attached. Should any additional fees be required, however, please charge the required fees to Pennie & Edmonds LLP Deposit Account No. 16-1150.

Respectfully submitted,

Date July 22, 2002

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Enclosure

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APPENDIX A

1.(amended) A micro-structured paper or paper-like material having a self-cleaning and/or non-adhesive effect [whereby said paper or paper-like material is hydrophobic across the entire cross-section of the material and which] wherein the paper or paper-like material is micro-structured in such a way that the surface is provided with elevations and depressions whereby the distance between the elevations ranges from 0.04 to 100 microns and the height of the elevations ranges from 0.04 to 100 microns, [and whereby said] wherein the paper or paper-like material [is characterized in that it] contains particles having [the] a size of 0.04 to 50 microns, wherein said particles [that] are bound to said paper or paper-like material by means of a binder, and [whereby said] wherein the paper or paper-like material is hydrophobic across the entire cross-section of the material.

2.(amended) [A] The paper or paper-like material [having a non-adhesive affect according to] of claim 1, wherein said paper or paper-like material is additionally oil repellant.

3.(amended) [A] The paper or paper-like material [according to] of claim 1 [or 2], wherein said paper or paper-like material has a contact angle with water greater than 120°.

4.(amended) A method to manufacture micro-structured paper or paper-like material that is water-repellant across the entire cross section of the material and having a self-cleaning and/or non-adhesive effect comprising: [, and which is provided]

providing a paper or paper-like material comprising fibers with elevations and depressions whereby the distance between the elevations ranges from 0.04 to 100 microns and the height of the elevations ranges from 0.04 to 100 microns; [as well, characterized in that]

providing particles of a size of 0.04 to 50 microns; [are added to the fibers of the paper or paper-like material and whereby]

and fixing said particles [are fixed] to the fibers by means of a wet-laying method using a binder together with [the use of] a water-repelling agent [in the scope of a wet-laying method].

5.(amended) [A] The method to manufacture micro-structured paper or paper-like material [according to] of claim 4, wherein said fibers are cellulosic fibers.

6.(amended) [A] The method of claim 4 [according to one of the claims 4 or 5], wherein said [employed] fibers comprise synthetic fibers made of polypropylene [(PP)], polyvinyl acetate, polythethylene [(PE)] or polylactic acid [(PLA)].

7.(amended) [A] The method [according to one of the claims] of claim 4 [through 6,] wherein said particles are added in the amount of about 5 to about 65% per basis weight of said paper [of] or paper-like material.

8.(amended) [A] The method [according to one of the claims] of claim 4 [through 7, wherein] further comprising adding an oil-repelling agent to the paper or paper-like material [is jointly used in addition].

9.(amended) [A] The method [according to one of the claims 4 through] of claim 8, wherein said water-repelling agents, [and/or] oil-repelling agents, or both are [agents manufactured according to] added by the colloidal solution/gel [the sol/gel (colloidal solution/gel)] method.

10.(amended) [A] The method [according to one of the claims] of claim 4 [through 9], wherein optionally a first oil-repelling agent is added to the paper or paper-like material, and further comprising adding a second supplementary water-repelling finish, a [and/or] oil-repelling finish, or both [finishing is performed in addition to the first use of a water-repelling agent and possibly an oil-repelling agent].

11.(amended) [A] The method according to [one of the claims 4 through 10] claim 4, wherein said particles are selected from [inorganic compounds such as] metal oxides, corundum, silicon dioxide, quartz, quartz powder, silica brine; TiO₂, carbonates, [and] sulfates, china, clay or talcum.

12.(amended) [A] The method according to [one of the claims 4 through 11] claim 4, wherein the binder is selected from latex binders, acrylate binders, [and/or] styrene binders, or mixtures thereof, or [and/or] fluorinated silanes, fluorinated [and] or non-fluorinated siloxanes, [and/or] functionalized [and] or non-functionalized silicone oils, or mixtures thereof.

13.(amended) [A] The method [according to one of the claims 4 through, 12 which includes] claim 4, further comprising an additional step of printing one micro-structured side of said paper or paper-like material.

14.(amended) [A] The method according to claim 13, wherein said printing occurs before making said paper or paper-like material water-repellant [or oil-repellant, or water- and oil-repellant in combination].

15.(amended) [Use of a] A paper or paper-like product comprising said paper or paper-like material according to claim 1, wherein said product is adapted to be [2 or 3 as] release paper, packing paper, [or] cardboard boxes, or posters, such that at least a portion of the paper or paper-like material is on the exterior of the release paper, packing paper, cardboard boxes, or posters [or other liquid-repellant papers that are exposed to environmental influences, for example].

16. (New) The method of claim 5, wherein said fibers additionally comprise synthetic fibers made of polypropylene, polyvinyl acetate, polythethylene, polylactic acid, or mixture thereof.

17. (New) The method of claim 8, further comprising the step of printing on the paper or paper-like material before adding said oil-repelling agent.

18. (New) A micro-structured paper or paper-like product having a self-cleaning and/or non-adhesive effect comprising:

a paper or paper-like material having a first surface and a second surface, wherein at least the first surface comprises alternating elevations and depressions, whereby the distance between the elevations ranges from 0.04 to 100 microns and the height of the elevations as determined from the depressions ranges from 0.04 to 100 microns;

particles having a size of 0.04 to 50 microns in an amount between about 5% and about 65% by weight of the paper or paper-like material, wherein the particles comprise an hydrophillic inorganic material bound to at least the first surface of the paper or paper-like material by means of a binder in an amount of about 1% to about 20% by weight of the paper and a first water-repelling agent in the amounts of 0.5 to 10% by weight of the paper or paper-like material applied by a wet-laying method;

wherein said paper or paper-like material is hydrophobic across the entire cross-section of the material and exhibiting a contact angle greater than 155° and substantially no hysteresis between advance contact angle and receding contact angle.

19. (New) The paper or paper-like material of claim 18, wherein the distance between the elevations ranges from about 0.4 to about 20 microns, the height of the elevations ranges from about 0.4 to about 20 microns, the particles have a mean size between about 0.08 microns and about 30 microns, and wherein the paper or paper-like material further comprises a second water-repelling agent in an amount between about 0.5% to about 10% by weight of the paper or paper-like material.

20. (New) The paper or paper-like material of claim 18, wherein the paper or paper-like material comprises cellulosic fibers, wherein both the first and the second sides comprise alternating elevations and depressions and the distance between the elevations ranges from about 0.4 to about 20 microns and the height of the elevations ranges from about

0.4 to about 20 microns, and wherein the particles are bound to both the first and the second sides of the paper or paper-like material.

21. (New) The paper or paper-like material of claim 20, wherein the paper or paper-like product further comprises hydrophobic organic particles having a mean size between about 0.08 microns and about 30 microns bound to at least the second surface by said binder.

22. (New) The paper or paper-like material of claim 20, wherein the paper or paper-like product further comprises fibers of polypropylene, polyvinyl acetate, polythethylene, polylactic acid, polyvinyl acetate, or bi-component fibers made of polypropylene and polyethylene.